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Joint Degeneration in Professional Sports

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ABSTRACT *The studies carried out so far have shown that under the action of overstressing and trauma, joint components undergo structural changes that translate into pain. Anatomically, they consist of destructive alterations of joint cartilages or fibro-cartilages, associated with proliferative lesions of the underlying bone tissue. The lesions are degenerative and represent a certain way of premature joint senescence. The purpose this work consists in identifying and prioritizing all causes of accidents, while indicating the most frequently incriminated causes.*

Introduction

In all the sports branches the performance improve from one year to another so that they represent a psychometric activity at the limit, requiring from the competitors a maximum effort of speed, strength, endurance, ability to concentrate under stress. Therefore, the risk of injury and illness of the sportsman also increases, just because of the intense stresses, close to functional limits of the body.

The studies carried out in this issue have revealed a large number of causes that favor or triggers accidents. They occur in different ways depending on the particularities of the environment, sports branch, sports field, equipment and facilities, sex, coach's pedagogical skills, etc.

Clinical trials carried out – arguments in the favor of the link between sport and joint degeneration

The direct trauma without fracture probably plays an important role in the occurrence of joint degeneration.

Demonstration of this role is obviously difficult. Experimental studies on the direct cartilage trauma show that after a shock not enough to create an immediate injury, in the traumatized area delayed cartilage degeneration may occur.

Rouvillain awarded 2/3 of the knee-cap injuries found by arthroscopic examination in 73 children, to a sports injury.

Another researcher concluded that mechanical stress significant as duration (not as intensity) come to exceed the elastic strength of the epiphyseal bone causing fatigue trabecular microfractures that could favor a chondral bone ischemia. Elasticity loss due to subchondral bone sclerosis has an echo on the overlying cartilage.

Joint degeneration common in professional sports

In medical sports practice the sports where more joint degenerations are met are football, handball, rugby, athletics, gymnastics etc. The table below shows the sports branches with most trauma.

Olympic disciplines with most numerous injuries (1988-2000)

	Sport branch	No. accidents	%
1	Football	4688	14.4
2	Handball	3395	10.42
3	Rugby	3280	10.07
4	Athletics	2769	8.5
5	Gymnastics	2765	8.49
6	Box	2365	7.26
7	Fights	1977	6.07
8	Basketball	1850	5.68
9	Ice Hockey	1629	5
10	Volleyball	1337	4.1
11	Judo	1211	3.72
12	Canoeing	1020	3.13
13	Fencing	688	2.05
14	Swimming	662	2.03
15	Weightlifting	636	1.95
16	Kayak-canoe	577	1.77
17	Skating	555	1.7
18	Other sports branches	1149	3.52
Total		32553	100%

Table no. 1

As location they concerned in order: knee, shoulder, elbow and wrist. Clinically they are characterized by intensity growing pain, accumulation of fluid in the joint, discrete "pulping" of the capsule-ligament formations.

Disorders occurring as a result of overstresses cause a series of micro-traumatic lesions at the musculoskeletal level, leading to the occurrence of specific clinical anatomical forms. This gradually limits the athlete's dynamic function leading in some cases to the early withdrawal of the athlete from competition activity.

When between the wear processes and the regeneration processes an imbalance occurs to the detriment of regeneration, this leads in the beginning to the occurrence of reversible disorders in the intimate cell structure and then to functional disorders (with changes in the intimate structure of cells).

The sports micro-traumatisms can be classified in:

a) Sporting micro traumatisms by acute overstress

These disorders occur as a result of a shortage of local recovery. Predisposing causes are the low anatomical vasculature of these formations and their elasticity difference

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from the other formations that make up the same anatomical biomechanical chain.

Change biomechanics or exercise cessation effort for a new lead to failure phenomena. Within this group distinguished: acute ligament and acute tendonitis. The most common sites are the internal collateral ligament of the knee (fencing, skiing), quadriceps tendon (weightlifting, football), brachial biceps tendon (Volleyball), Achilles tendon (gymnastics).

b) Sporting micro traumatisms in fact

These disorders address in particular the osteo-cartilaginous formations and are produced by agents with axial centripetal directions, clearly identified in a number of sports. Thus, we distinguish:

1. Boxer's painful fist. It is caused by micro-lesions produced by the action of axial centripetal forces resulting from consecutive and violent hitting with the fist. These lesions are initially localized in the cartilages of the articular surfaces; lately the lesions are complicated with bone necrosis phenomena in the carpian bones, particularly in the scaphoid and semilunar bones. The evolution is lasting. Untreated cases lead eventually to osteoarthritis. the occurrence of repeated micro traumatisms at this level, following to consecutive lower limb mechanical stress. The disease is specific to soccer players using the procedure of kicking with the "flat" side of the foot (medial edge of the foot), which causes "openings" of the pelvis which forces the pelvic symphysis. The clinical symptoms include pain in the pubis symphysis, related to workout carried on in improper conditions (mud, snow, heavy and wet ball).

3. Lawn tennis player's painful elbow is a miocrotraumatism expressed by humeral epicondylitis, driven by the action in the form of sudden and violent traction on epicondylian inserts of forearm supinator muscles. In the early stage, a bone insertion enthesitis occurs and in the late stage the microtraumatism is complicated with a process of periostitis and secondary damage of subjacent bone tissue. It is characterized by the appearance of acute pain in the upper outer region of the elbow especially pronounced by supination movements of the arm.

4. Back pain of kayak paddlers is a condition characterized by pain in the back lumbar spine encountered in kayak paddlers, rowers, canoe paddlers, and which is due to interspinous apophisitis. It is characterized on the one hand by lesions of the interspinous ligament and of the spinous inserts thereof, and on the other hand by arthrosic type lesions in the interspinous joint surfaces.

5. Painful hand of gymnasts refers to painful complaints, especially in the hypothenar eminence, produced by the hyperextension of the hand in the sitting on hands position or when working on the fixed bar, parallel, rings. It is due to consecutive multidirectional stress of the piramidal-pisiform joint. In the late stage even the change of anatomical appearance of the joint, arthrosis may occur. **6. Runner's painful foot** is a micro traumatism caused by the axial flexion forces in the metatarsal bone generated by long-distance races and middle-distance races. The clinical symptoms consist of occurrence of persistent pain in the foot, especially after workouts or long races.

c. Micro traumatisms in children and junior athletes

This group of disorders includes clinical forms more frequently encountered in insufficiently matured bones, in growth cartilages, ossification centers which fall within the group of epiphysitis or aseptic necrosis. The prognosis is serious if the condition is not treated quickly and properly, because it affects the normal development of the segment in question. The locations of the most common of these epiphysites, apophysites or osteochondrites are:

1. Scheuermmann vertebral epiphysitis (7-14 years, gymnastics, athletics, sports games). Symptoms of this condition consist of pain in the spine, exacerbated by effort, condition marked by fatigue, spinal deformity (kyphosis) and stiffness, appearance of compensatory lordosis.

2. Osgood-Schlatter superior anterior tibial apophysitis (12-14 years, soccer, skating, gymnastics) is a pseudoapophysitis produced by repeated tractions of the patellar tendon on its insertion on the superior anterior ossification nucleus of the tibia. Clinically it manifests itself by spontaneous pain on palpation of the anterior superior tibial spines, accompanied by deformation, hyperemia and hyperthermia of the region.

3. Sinding Larsen Johanson patellar apophysitis (10-15 years, sports, skating, gymnastics) is manifested by pain in the kneecap, especially in squats, accompanied by deformation of the region. Radiograph shows a dystrophic process with areas of condensation and osteoporosis of the patella (the appearance of the sky with clouds).

4. Severe calcaneal apophysitis (beat foot in basketball, athletics, volleyball, handball, boys 9-15 years). It is due to the fracture by pressure to the nucleus of ossification of the large calcaneus apophysis and frequently is located on the beat foot. Clinically it manifests itself by live pain and lameness, swelling and redness of the region.

Mechanisms and predisposing factors of joint degenerations

- sports hyperactivity performed throughout the athlete careers;
- overstress and excessive use of the joint;
- intense mechanical stresses exercised on the articular surface, leading to microfractures of the subchondral bone. This phenomenon involves changes in the cartilage and lead to arthrosis. Absence of a recovery period can inhibit joint regeneration.
- recurrent injury risks to destabilizing the joint and to increase the frictions leading as such to the onset of osteoarthritis;
- traumatisms are often responsible by direct mechanism
- direct shock, tough and indirect impact - neglected chronic tendon and ligament injuries, articular instability with periarticular ossification.
- The treatment by itself may favor the occurrence of osteoarthritis:

• meniscectomias
• fixation of fractures, when a perfect joint congruence is not achieved and thus the joint anatomy is not restored.

Prevention of injuries

To obtain complex prophylactic and therapeutic effects special forms and methods of physiotherapy are developed, determined by the particular features of some groups of diseases or by individual clinical needs. In the workout program specific exercises are introduced in order to increase the elasticity of articular and periarticular structures, the resistance of tendons and ligaments in parallel with muscle elasticity, resulting in strengthening the biome-

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chanics of the crossed joints, giving stability but also the maximum use of the motion limits in that joint.

Prevention of injuries can be classified as primary, secondary and tertiary. The examples of primary prevention include prophylactic bandaging (tapping and strapping) regardless of the injuries previously occurring.

The secondary prophylaxis is represented by early diagnosis of trauma and skilled intervention to prevent the installation of a disability and to reduce incidence of recurrence of injury, while tertiary prevention focuses on recovery to correct existing disability and considered to be predisposing factors in the occurrence of trauma.

Conclusions

The severity of injuries that occur during the practice of various sports is determined not so much by the resulted injuries, but especially by the fact that traumatized athletes are forced to give up competitive activity for a longer period. Sometimes, although the trauma is not serious from a medical standpoint, the late consequences (sequelae) require the permanent abandonment of sports activity, which facts results in unpleasant consequences, such as: a serious harm brought to the club and even to the national team (when the traumatized athlete is of an exceptional value) or his removal from the social activity.

The professional sport is, in conclusion, generator of suffering of the musculoskeletal apparatus. But the advantages of sport on the musculoskeletal apparatus are also well known. Where these advantages stop and where the inconvenience starts is not so easy to be specified. Prevention in these cases will change not "what" effort the athlete makes, but "how" he makes this effort. This means compliance with physical exercise rules: warm before the in fact exercise, progressive workout, gradual stop of the effort, recovery time etc.

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